

We claim:

1. A method of operating an ingress entity of a packet-based network, comprising:

5 receiving a stream of voice data;
passing the voice data through a processing stage;
sending processed voice data across the packet network;
detecting whether the received stream of voice data contains tandem free operation (TFO) information and, if TFO information is
10 present, sending the TFO information across the packet network without passing it through the processing stage.

2. A method according to claim 1 further comprising inserting the TFO information into packets for sending across the packet
15 network.

3. A method according to claim 2 wherein the TFO information is carried in the same packets as the processed voice data.

20 4. A method according to claim 2 wherein the TFO information is carried in separate packets from the processed voice data.

25 5. A method according to claim 2 wherein the TFO information comprises TFO (IS) messages and TFO frames of coded voice data and wherein a common packet format is used to carry both types of TFO information.

30 6. A method according to claim 5 wherein the structure of the payload differs according to whether the packet contains TFO (IS) messages or TFO frames.

7. A method according to claim 2 wherein the packet comprises an indication of the quantity of TFO data carried within the packet.

8. A method according to claim 2 wherein the packets carrying TFO information further comprise information about the time alignment of the TFO information carried in the packet.

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9. A method according to claim 8 wherein the processed voice data is carried across the packet network by a sequence packets which have include timestamp information and the packets carrying the TFO information share the same timestamp information.

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10. A method according to claim 1 further comprising removing TFO information from the stream of voice data before passing the voice data through the processing stage.

15 11. A method according to claim 2 further comprising receiving information about the format of packets to be used to carry the TFO information during a call.

20 12. A method according to claim 1 further comprising receiving information about the capabilities of an egress entity of the packet network.

25 13. A method according to claim 12 wherein the information about the capabilities of an egress entity is received during call establishment.

14. A method according to claim 12 wherein the information comprises information about the buffering capabilities of the egress entity.

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15. A method according to claim 14 wherein the information comprises information about the capabilities of the egress entity to buffer TFO frames in parallel with speech data.

16. A method according to claim 2 wherein the packets carrying TFO information are sent at regular intervals.

17. A method according to claim 1 wherein the TFO information 5 comprises TFO frames of coded voice data and the method further comprises sending the TFO frames, in unprocessed form, in a channel which occupies less than 64kbit/s.

18. A method of operating an ingress entity of a packet-based 10 network, comprising:

receiving a stream of voice data which contains tandem free operation (TFO) frames of coded voice data; and,

sending the TFO frames across the packet network in an unprocessed form via a channel which has a rate of less than 15 64kbit/s.

19. A method according to claim 18 wherein the stream of voice data contain other voice data which is to be sent across the packet network, the method further comprising sending the other 20 voice data across the packet network in a processed form.

20. A method of operating an egress entity of a packet-based network, comprising:

receiving packets containing processed voice data;

25 receiving packets containing unprocessed tandem free operation (TFO) information; and,

reinserting the TFO information into the voice data before onward transmission.

30 21. A method according to claim 20 wherein the packets containing TFO information further comprise timing information about the TFO information, and wherein the step of inserting the TFO information into the voice data makes use of the timing information.

22. A method according to claim 21 wherein the packets containing processed voice data include timestamp information and the packets containing TFO information share the same timestamp
5 information.

23. A method according to claim 20 further comprising inserting TFO synchronising information into the voice data stream to maintain downstream synchronisation in the event that packets
10 containing TFO information are not received in a timely or error free manner.

24. A method according to claim 20 wherein the TFO information is carried in the same packets as the processed voice data.
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25. A method according to claim 20 wherein the TFO information is carried in separate packets from the processed voice data.

26. A method according to claim 20 wherein the TFO information
20 comprises TFO (IS) messages and TFO frames of coded voice data and wherein a common packet format is used to carry both types of TFO information.

27. A method according to claim 26 wherein the structure of the
25 payload differs according to whether the packet contains TFO (IS) messages or TFO frames.

28. A method according to claim 27 wherein the packet comprises an indication of the quantity of TFO data carried within the
30 packet.

29. A method according to claim 20 further comprising receiving information about the format of packets to be used to carry the TFO information during a call.

30. A method according to claim 20 further comprising receiving information about the capabilities of an ingress entity of the packet network.

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31. A method according to claim 30 wherein the information about the capabilities of an ingress entity is received during call establishment.

10 32. A method according to claim 30 wherein the TFO information comprises TFO frames of coded voice data and the method further comprises receiving packets containing TFO frames, in unprocessed form, in a channel which has a rate of less than 64kbit/s.

15 33. Apparatus for use at the ingress of a packet-based network comprising:

means for receiving a stream of voice data;

means for passing the voice data through a processing stage;

means for sending processed voice data across the packet network;

means for detecting whether the received stream of voice data contains tandem free operation (TFO) information and, if TFO information is present, sending the TFO information across the packet network without passing it through the processing stage.

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34. Apparatus for use at the ingress of a packet-based network comprising:

means for receiving a stream of voice data which contains tandem free operation (TFO) frames of coded voice data; and,

30 means for sending the TFO frames across the packet network in an unprocessed form via a channel which has a rate of less than 64kbit/s.

35. Apparatus for use at an egress of a packet-based network, comprising:

means for receiving packets containing processed voice data;
means for receiving packets containing unprocessed tandem
free operation (TFO) information; and,
means for reinserting the TFO information into the voice
data before onward transmission.

36. A computer program product for implementing a method of
10 operating an ingress entity of a packet network, the computer
program product comprising a computer-readable medium carrying
computer-executable instructions for causing the ingress entity to
perform the steps of:

receiving a stream of voice data;
15 passing the voice data through a processing stage;
sending processed voice data across the packet network;
detecting whether the received stream of voice data contains
tandem free operation (TFO) information and, if TFO information is
present, sending the TFO information across the packet network
20 without passing it through the processing stage.

37. A computer program product for implementing a method of
operating an ingress entity of a packet network, the computer
program product comprising a computer-readable medium carrying
25 computer-executable instructions for causing the ingress entity to
perform the steps of:

receiving a stream of voice data which contains tandem free
operation (TFO) frames of coded voice data; and,
sending the TFO frames across the packet network in an
30 unprocessed form via a channel which has a rate of less than
64Kbit/s.

38. A computer program product for implementing a method of
operating an egress entity of a packet network, the computer

program product comprising a computer-readable medium carrying computer-executable instructions for causing the egress entity to perform the steps of:

receiving packets containing processed voice data;

5 receiving packets containing unprocessed tandem free operation (TFO) information; and,

reinserting the TFO information into the voice data before onward transmission.

10 39. A telecommunications system comprising the ingress entity according to claim 33.

15 40. A packet-based signal for transmission across a packet network comprising voice data which has been processed by an ingress entity of the network and tandem free operation (TFO) information which has not been subject to the same processing.

20 41. A packet-based signal according to claim 40 wherein a portion of the signal carrying the unprocessed TFO information has a rate of less than 64kbit/s.

42. A method of operating an ingress entity of a packet-based network, comprising:

receiving a stream of data; and,

25 sending the data across the packet network in an unprocessed form via a channel which has a rate of less than 64kbit/s.

43. Apparatus for use at the ingress of a packet-based network comprising:

30 an input responsive to a stream of voice data;
a processing stage which processes the voice data;
an output from which processed voice data is sent across the packet network;

a detection unit which is arranged to detect whether the received stream of voice data contains tandem free operation (TFO) information and wherein the detection unit is further arranged, if TFO information is present, to send the TFO information across the 5 packet network without passing it through the processing stage.

44. Apparatus for use at the ingress of a packet-based network comprising:

an input responsive to a stream of voice data which contains 10 tandem free operation (TFO) frames of coded voice data; and, a transmission unit which is arranged to sending the TFO frames across the packet network in an unprocessed form via a channel which has a rate of less than 64kbit/s.

15 45. Apparatus for use at an egress of a packet-based network, comprising:

an input responsive to packets containing processed voice data and packets containing unprocessed tandem free operation (TFO) information; and,

20 a reinsertion unit which is arranged to reinsert the TFO information into the voice data before onward transmission.